LOWER PERMIAN BRYOZOA FROM WESTERN AUSTRALIA

by JUNE R. P. PHILLIPS ROSS

ABSTRACT. Scattered bryozoan localities in the Lyons Group contain three species of *Stenopora*, *S. dickinsi* sp. nov., *S. fisheri* sp. nov., and *S. lyndoni* sp. nov., that show little similarity to previously described species.

The fenestellid *Polypora lyndoni* occurring at all the bryozoan localities studied has close affinities with two species from the Lower Permian of eastern Australia and one species from the Asselian of Timor. These species appear to be primitive members of a group of species described from the upper part of the Sakmarian Series of the Urals.

FOSSILS are generally rare and sporadic in the Lyons Group, which crops out in a belt extending from the Lyndon River to the Wooramel River in the Carnarvon (North-West) Basin, Western Australia (text-fig. 1). The group is about 4,600 feet thick in the Moogooree area and thins southward to 2,640 feet in the Wooramel River area (Condon 1954, pp. 40, 43).

The Lyons Group begins with the Permian? lepidodendroid plant-bearing Harris Sandstone, which rests conformably on the Pre-Cambrian basement, and consists of tillite, greywacke, siltstone, sandstone, and conglomerate. It is conformable with the overlying Permian (Upper Sakmarian or Lower Artinskian) Callytharra Formation (Table 1).

Previous studies of fossils from the Lyons Group include description of brachiopods by Prendergast (1943), Coleman (1957), and Thomas (1958), description of molluscs by Dickins (1956, 1957), description of two species of Foraminiferida by Crespin (1958), and a record of brachiopods, molluscs, Bryozoa, and crinoids by Dickins and Thomas (1959). The Bryozoa occur in thin, local calcareous lenses within the tillite, sandstone, and conglomerate beds.

Age of the fauna of the Lyons Group. From the faunal data in strata overlying the Lyons Group, Teichert (1941, 1947) considered the Lyons Group to be Sakmarian in age. Later studies of the faunas from the Lyons Group, summarized by Dickins and Thomas (1959), and from the overlying strata have supported Teichert's findings.

Relations of bryozoan species in the Lyons Group. The scattered bryozoan collections that were examined from the Lyons Group indicate that the bryozoan species range laterally and vertically throughout the group. At locality ML 6, considered to be in the lower part of the Lyons Group, the bryozoans *Stenopora dickinsi* sp. nov., and *Polypora lyndoni* sp. nov. occur with the following brachiopods and molluscs listed by Dickins and Thomas (1959): *Trigonotreta*? sp. indet., *Neospirifer* sp. indet., *Linoproductus* (*Cancrinella*) *lyoni* Prendergast (1943), Rhynchonellacea gen. indet., Rostrospiracea? gen. indet., *Deltopecten lyonsensis* Dickins (1957). Higher in the succession in the upper part of the Lyons Group in the northern part of the Carnarvon Basin at locality ML 90, the bryozoans *Stenopora dickinsi*, *S. lyndoni*, and *Polypora lyndoni*, are associated with

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Stutchburia variabilis Dickins (1957) and *Deltopecten lyonsensis* Dickins (1957); and at localities ML 106, ML 107, and ML 109 in the upper part of the Lyons Group the bryozoans *Stenopora dickinsi* and *Polypora lyndoni* occur with the following fossils listed by Dickins and Thomas (1959): *Trigonotreta* sp. nov., *Linoproductus* (*Cancrinella*) *lyoni* Prendergast (1943), *Neospirifer* sp. nov., *Pseudosyrinx* sp. nov., *Stutchburia variabilis* Dickins (1957), *Astartila condoni* Dickins (1957), *Cleobis sp.*, *Eurydesma* sp. indet., *Schizodus crespinae* Dickins (1957), *Deltopecten lyonsensis* Dickins (1957), *Aviculopecten* sp. indet., *Peruvispira umariensis* (Reed) (1928), *Mourlonia? lyndonensis* Dickins (1957),

TABLE 1

Suggested correlation of Permian units referred to in text

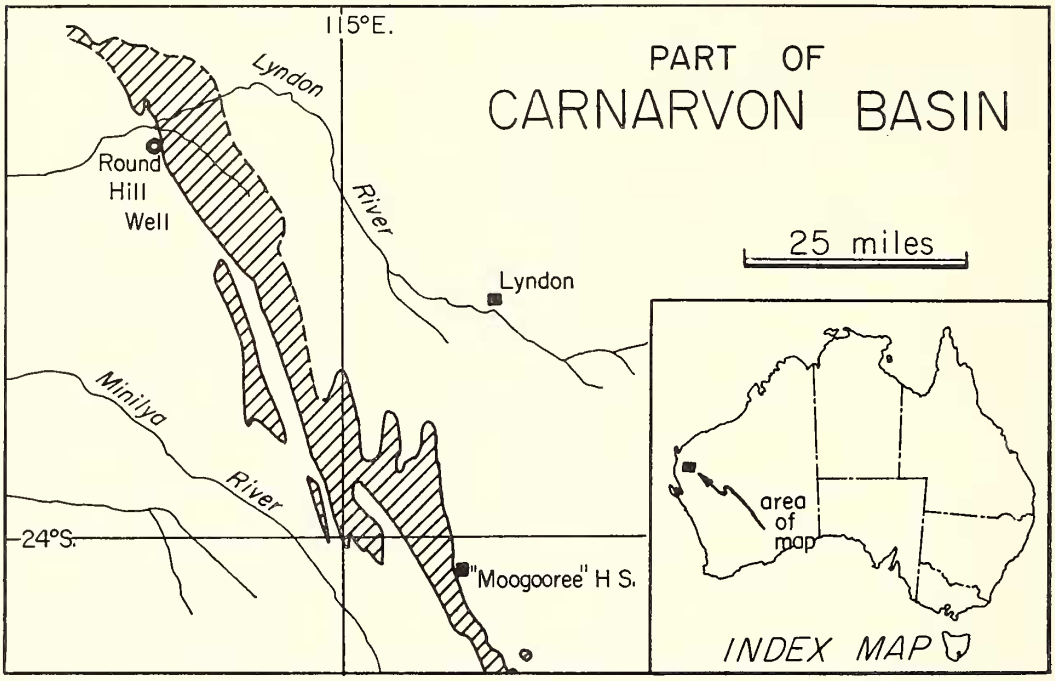
Ural Mts., U.S.S.R.	*Carnarvon Basin, Western Australia*	*Yarrol Basin, Queensland, Australia*	*Hunter River Valley, N.S.W., Australia*	*South Coast, N.S.W., Australia*	*Eastern Tasmania, Australia*	*Timor*	*Glass Mts., Texas, U.S.A.*	
Kungurian				?—? Westley Park Tuffs ?—?				
Artinskian	? Callytharra Formation ?							
Sakmarian		?—?				?		
Asselian	Lyons Group ?	Lake Creek Beds	?—? Allandale Formation (*Eurydesma cordatum*) ?—? Lochinvar Formation		? Berriedale Limestone	Bitauni Beds	Lenox Hills Formation Neal Ranch Formation	Wolfcampian

Keeneia carnarvonensis Dickins (1957), Calceolispongidae gen. et sp. nov., *Conularia sp.*, and *Calcitornella stephensi* (Howchin) (1894).

The fenestellid *Polypora lyndoni* is closely comparable with two species of *Polypora* occurring in the lower Permian of eastern Australia; one of the species, *Polypora keppelensis* Crockford 1962, is from the Lake Creek Beds, Queensland, and the other, *P. pertinax*, is from the *Eurydesma cordatum* horizon, New South Wales. It also closely resembles *P. tripliseriata* Bassler from the Asselian Bitauni Beds of Timor. All these species appear to be primitive members of a group of species including *P. tuberculifera*, *P. punctata*, *P. subvariicellata*, and *P. nadinae* described from the Sterlitamak Beds (upper part of the Sakmarian Series) of the Urals.

The stenoporids from the Lyons Group show little similarity with previously described species from Australia. However, few species of *Stenopora* have been described from the lower part of the Permian succession in eastern Australia. The four bryozoan species of

the Lyons Group show no similarities with those in the overlying Callytharra Formation. The genera occurring in the Callytharra Formation described by Crockford (1951), including *Hexagonella*, *Evactinopora*, *Protoretepora*, *Penniretepora*, *Ramipora*, *Streblotrypa*, *Rhombocladia*, and *Streblocladia*, were not found in the Lyons Group.



TEXT-FIG. 1. Index map to bryozoan collection localities in the Lyons Group, Carnarvon Basin, Western Australia. Hatching indicates outcrop area of Lyons Group. Map after M. A. Condon, J. M. Dickins, and G. A. Thomas.

Acknowledgements. I express my sincere thanks to Drs. J. M. Rayner, Director; N. H. Fisher, Chief Geologist; and J. M. Dickins, Palaeontologist; of the Bureau of Mineral Resources, Australia, for the loan of the specimens examined from the Lyons Group. Dr. J. M. Dickins kindly helped locate the material and compiled information about the collection localities and their stratigraphic position.

Repository. CPC—Commonwealth Palaeontological Collections, Bureau of Mineral Resources, Canberra, A.C.T., Australia.

SYSTEMATIC DESCRIPTIONS

Order TREPOSTOMATA

Family STENOPORIDAE Waagen and Wentzel

Genus STENOPORA Lonsdale

1844 *Stenopora* Lonsdale, p. 178.
1845*a* *Stenopora* Lonsdale, p. 262.
1943 *Stenopora* Lonsdale; Crockford, p. 261.
1962 *Stenopora* Lonsdale; Ross and Ross, pp. 41, 42.
1929 *Ulrichotrypa* Bassler, p. 55.

1844 *Tubuliclidia* Murchison and Verneuil [*nomen nudum*], pp. 497–8.
1845*b* *Tubuliclidia* Murchison, Verneuil, and Keyserling [*nomen nudum*], p. 221.
1949 *Tubuliclidia* Duncan [*nomen nudum*], p. 131.

Type species. Stenopora tasmaniensis Lonsdale, 1844, p. 161, from the Permian, Tasmania, Australia.

Diagnosis (after Crockford 1943). Colonies are ramose, encrusting, laminar, massive, or frondescent. The zooecial tubes have thin walls in the axial region and irregularly thickened, moniliform walls in the peripheral region. Diaphragms are extremely rare or absent. Acanthopores are well developed, are generally large and very numerous, and commonly occur in two series. Mesopores lack diaphragms and are generally fewer in number than the zooecia. Monticules, and less commonly maculae, are generally present except for some ramose species which lack them.

Stenopora dickinsi sp. nov.

Plate 8, figs. 1–3, 5–8; Plate 9, figs. 1–5, 7–9

Type material. Holotype CPC ML 109–2, and paratypes CPC ML 109–1, ML 109–3; from the upper part of the Lyons Group, locality ML 109, 410 feet west of ML 106 in the Lyndon River area. Paratypes CPC ML 106–1 to ML 106–5; from the upper part of the Lyons Group, locality ML 106, approximately 3 miles north-north-east of Round Hill Well, Lyndon River area. Paratypes CPC ML 90–2, ML 90–4; 45 feet below the top of the Lyons Group, approximately 2 miles north-north-east of Round Hill Well, Lyndon River area.

Description. Colonies are slender, branching cylindrical stems, the fragments studied being 1 to 2 cm. in length (Pl. 9, figs. 2, 4). Maculae and monticules were not observed. Some colonies display broad, flat, proximal bases about 8 mm. in diameter (Pl. 9, fig. 8).

In tangential sections the oval zooecial openings are regularly aligned longitudinally (Pl. 8, figs. 6, 7, 8). The zooecial walls are narrower or about the same width as the zooecial openings and are penetrated by prominent acanthopores, generally 0·05 to 0·09 mm. in diameter, but smaller acanthopores with diameters as small as 0·02 mm. are occasionally present. Mesopores are very rare and, if present, are about the same size as the acanthopores (Pl. 8, fig. 6).

In longitudinal sections the zooecial walls are longitudinally laminate in the axial region and may show two or three narrow bands of monilae (Pl. 9, fig. 5). The zooecial walls thicken considerably in the peripheral region and display low, broad monilae that have a laminate microstructure in which steeply inclined laminae line the inner parts of the zooecial walls and pass into the outer part of the zooecial walls as broad, distally convex laminae. The peripheral region is as wide as the axial region (Pl. 8, fig. 2).

In transverse sections the laminate microstructure of the zooecial walls in the peripheral region is well displayed. The laminae curve steeply from the inner part near the zooecial tube and make a broad distally convex arc in the outer part of the zooecial wall. Laminae of adjacent zooecia intertongue inconspicuously in the outer region (Pl. 8, fig. 3). In the peripheral region the steeply inclined laminae of the acanthopores cut through the zooecial walls (Pl. 9, figs. 1, 3). In the axial region where the zooecial walls are slightly moniliform, the polygonal zooecial tubes may have acanthopores at their wall junctions (Pl. 8, fig. 5; Pl. 9, fig. 1).

Remarks. The species is characterized by colonies of small diameter with five to ten

distinct acanthopores in slender, moniliform walls. Mesopores and diaphragms are very rare.

Stenopora dickinsi is not closely similar to species described either from the Permian of the Fitzroy Basin (Crockford 1957) or from eastern Australia. It shows certain

TABLE 2

Measurements of *Stenopora dickinsi* sp. nov. (in mm.)

CPC numbers	*ML 109–2*	*ML 90–2*	*ML 90–4*	*ML 106–1*	*ML 106–5*
Diameter of zoarial stem	3·5–4·0	5–6	4·5	4	2·3–2·5
No. of zooecia per 2 mm. longitudinally	3·5–4·5	3–4·5	3–4	3	4
Diameter of zooecial opening max.	0·35×0·21	0·40×0·24	0·31×0·21	0·39×0·17	0·33×0·21
min.	0·24×0·16	0·24×0·15	0·26×0·12	0·26×0·15	0·21×0·12
Diameter of mesopore	——	——	——	——	(0·05–0·08)×0·05
Diameter of acanthopore	0·03–0·09	0·03–0·07, generally 0·05–0·07	0·05–0·09	0·02–0·09	0·04–0·10
Zooecial wall thickness long.	0·11–0·27	0·07–0·26	0·10–0·39	0·15–0·23	0·10–0·19
lat.	0·13–0·29	0·07–0·21	0·07–0·23	0·12–0·28	0·10–0·16
No. of diaphragms in zooecial tube	0–1	——	——	——	——
Width of peripheral region	0·88–0·90	1·26	1·4–1·6	1·54	0·55
Ratio: width of peripheral part of zooecium/total width of zooecium	0·5	0·5	0·64	0·63	0·66
No. of large acanthopores per zooecial opening	3–8	5–8	6–10	5–8	5–8
No. of small acanthopores per zooecial opening	0–1	——	——	0–1	0–1
No. of mesopores per zooecial opening	——	——	——	——	0–2

similarities to *S. gracilis* (Dana) (Crockford 1943) from the Westley Park Tuffs, Permian, New South Wales, Australia, in its broad basal attachment, size of its zoarial stem, number of zooecial openings per 2 mm., remote monilae across the axial region, broad monilae in the peripheral region, and sparse distribution of mesopores. However,

EXPLANATION OF PLATE 8

Figs. 1–3, 5–8. *Stenopora dickinsi* sp. nov. 1, Tangential section showing oval zooecial openings and zooecial walls pierced by large acanthopores, locality ML 109, CPC ML 109–2, ×50. 2, Longitudinal section showing slender zooecial walls in axial region and greatly thickened, laminate walls in abraded peripheral region, locality ML 106, CPC ML 106–5, ×20. 3, Part of transverse section showing laminate microstructure of zooecial walls in the peripheral region, locality ML 90, CPC ML 90–2, ×50. 5, Transverse section showing thin-walled, polygonal zooecia in axial region and thickened zooecial walls in the peripheral region, locality ML 109, CPC ML 109–3, ×20. 6, Tangential section showing large acanthopores and occasional mesopore around zooecial openings, locality ML 106, CPC ML 106–2, ×50. 7, Tangential section showing longitudinal alignment of zooecial openings, locality ML 109, CPC ML 109–2, ×20. 8, Tangential section showing laminate microstructure in zooecial walls and acanthopore walls, locality ML 109, CPC ML 109–2, ×100.

Fig. 4. *Stenopora fisheri* sp. nov. Part of longitudinal section showing moniliform zooecial walls in peripheral and subperipheral regions, locality ML 107, CPC ML 107–4, ×20.

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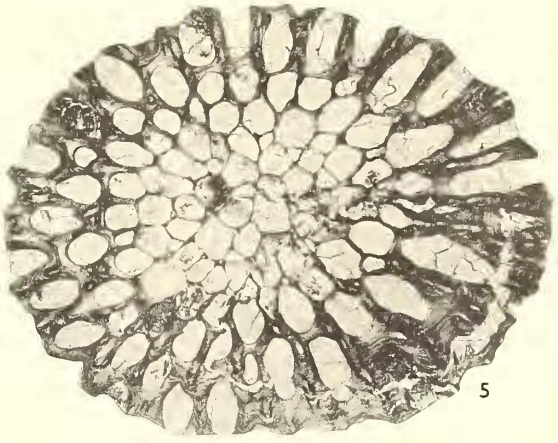

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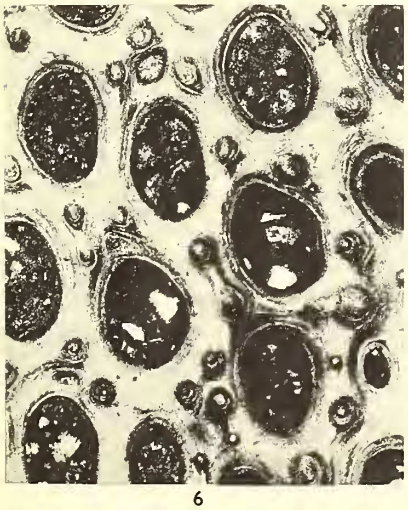

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PHILLIPS ROSS, Lower Permian Bryozoa

S. dickinsi has slightly larger zooecial openings, narrower zooecial walls, fewer acanthopores, and a considerably wider peripheral region. *S. parallela* Crockford (1945) from the Permian, Mt. Wellington, Tasmania, is similar to *S. dickinsi* in the size of its zoarial stem, diameter of the zooecial openings, broad monilae in the peripheral region, and remote monilae in the axial region. It differs from *S. dickinsi* in having fewer acanthopores per zooecium, fewer zooecia per 2 mm., and a narrower peripheral region.

The species is named in honour of Dr. J. M. Dickins, Bureau of Mineral Resources, who has studied extensively the Permian faunas of Western Australia.

Stenopora fisheri sp. nov.

Plate 8, fig. 4; Plate 10, figs. 1–9

Type material. Holotype CPC ML 107–4, paratypes CPC ML 107–2, –5, –8; uppermost part of the Lyons Group, locality ML 107, Lyndon River area. Paratype CPC ML 109–4, upper part of the Lyons Group, locality ML 109, Lyndon River area.

Description. Colonies are slender, cylindrical branching stems (Pl. 10, figs. 2, 3). Monticules and maculae were not observed.

TABLE 3

Measurements of *Stenopora fisheri* sp. nov. (in mm.)

CPC numbers		*ML 107–4*	*ML 107–5*	*ML 109–4*
Diameter of zoarial stem		5–8	5–7	2·5–3·0
No. of zooecia per 2 mm. longitudinally		3–4	3·5–4	4–4·5
Diameter of zooecial opening	max.	0·48×0·36	0·43×0·28	0·46×0·32
	min.	0·26×0·19	0·28×0·17	0·32×0·21
Diameter of mesopore	max.	0·38×0·12	0·16×0·13	0·05×0·05
	min.	0·05×0·05	0·08×0·05	0·26×0·19
Diameter of acanthopore		0·02–0·16	0·02–0·08	0·02–0·13
Zooecial wall thickness	long.	0·05–0·08	0·10–0·21	0·05–0·16
	lat.	0·05–0·17	0·10–0·21	0·04–0·16
No. of diaphragms in zooecial tube		0–1 or 2	0	0
Width of peripheral region		1·76; 2·0	2·2; 2·5	0·88; 0·66
Ratio: width of peripheral part of zooecium/total width of zooecium		0·68; 0·57	0·66–0·70; 0·55	0·66; 0·60
No. of large acanthopores per zooecial opening		5–8	5–6	4–5
No. of small acanthopores per zooecial opening		0–2	1–2	0
No. of mesopores per zooecial opening		1–5	0–3	1–3

In tangential sections the zooecial openings are irregularly spaced and enclosed by slender walls considerably narrower than the zooecial openings (Pl. 10, figs. 1, 4, 6–8). The narrow walls are penetrated by large, dense acanthopores that may protrude into the zooecial openings (Pl. 10, figs. 4, 7). Numerous shallow mesopores also lie in the zooecial walls between adjacent zooecia (Pl. 10, figs. 7, 8).

In longitudinal sections the zooecial walls are slender and longitudinally laminate in the axial region (Pl. 8, fig. 4). The zooecial tubes curve in a broad arch into the peripheral region and are slightly oblique to the zoarial surface. The zooecial walls thicken in the

peripheral region and display narrow, elongate monilae (Pl. 10, fig. 5) and have a laminate microstructure in which steeply inclined laminae line the inner parts of the zooecial walls and pass into the outer part of the zooecial walls as broad distally convex laminae (Pl. 10, fig. 9). Laminae of adjacent walls merge inconspicuously in this outer part or are penetrated by the steeply inclined laminae of the acanthopore walls. Diaphragms are generally lacking.

Remarks. Stenopora fisheri is characterized by slender, branching, colonies having large zooecia, mesopores, and numerous large acanthopores enclosed in slender zooecial and mesopore walls. It shows little similarity with previously described species, although it resembles *S. dickinsi* in its slender, cylindrical stems and numerous, distinctive acanthopores. It differs from this species in having larger zooecial openings, larger acanthopores, and numerous large mesopores.

The species is named in honour of Dr. N. H. Fisher, Bureau of Mineral Resources, Australia.

Stenopora lyndoni sp. nov.

Plate 11, figs. 1–3, 6–10

Type material. Holotype CPC ML 90–1, paratype CPC ML 90–3; 45 feet below the top of the Lyons Group; locality ML 90, Lyndon River area, approximately 2 miles north-north-east of Round Hill Well; lat. 23° 21′ S., long. 114° 41′ E.

Description. Colonies are slender, cylindrical, branching stems (Pl. 11, figs. 6, 8, 9). Maculae and monticules were not observed.

In tangential sections the oval zooecial openings are irregularly spaced in longitudinal ranges (Pl. 11, figs. 1, 3, 7). The elongate zooecia are separated by walls as thick as the width of the zooecial openings. Numerous large (0·07 to 0·09 mm. diameter), dense acanthopores penetrate the zooecial walls. Small acanthopores, 0·02 mm. in diameter, having less dense walls, are sparse. Mesopores are small and sparsely distributed.

EXPLANATION OF PLATE 9

Figs. 1–5, 7–9. *Stenopora dickinsi* sp. nov. 1, Part of transverse section showing acanthopores at junction of zooecial walls in axial region and thickened zooecial walls in peripheral region, locality ML 106, CPC ML 106–5, ×50. 2, External aspect of fragment of colony, locality ML 106, CPC ML 106–3, ×5. 3, Part of transverse section in peripheral region showing steeply inclined laminae of acanthopore walls cutting through the more gently curved laminae of the zooecial walls, locality ML 106, CPC ML 106–5, ×100. 4, External aspect of fragment of colony, locality ML 106, CPC ML 106–2, ×5. 5, Longitudinal section showing slender walls, partly crushed, in axial region and thickened, slightly moniliform zooecial walls in peripheral region, locality ML 109, CPC ML 109–2, ×20. 7, Part of longitudinal section showing narrow peripheral region of thickened walls, locality ML 106, CPC ML 106–5, ×50. 8, External aspect of zoarial fragment showing broad base of attachment, locality ML 106, CPC ML 106–1, ×5. 9, Part of transverse section showing thin-walled polygonal zooecia in the axial region, and thickened zooecial walls in the peripheral region, locality ML 90, CPC ML 90–2, ×20.

Figs. 6, 10–12. *Polypora lyndoni* sp. nov. 6, External aspect of fenestrate colony showing meshwork pattern and zooecial openings, locality ML 107, CPC ML 107–20, ×5. 10, External aspect of basal part of funnel-shaped zoarium, locality ML 109, CPC ML 109–10, ×2. 11, General aspect of inner surface of funnel-shaped zoarium near its base showing zooecial openings, locality ML 109, CPC ML 109–10, ×2. 12, Inner surface of basal part of colony showing arrangement of zooecia and rudimentary fenestrules, locality ML 107, CPC ML 107–22, ×2.

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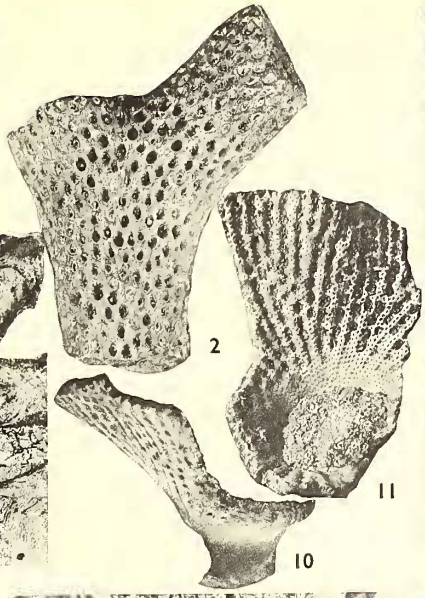

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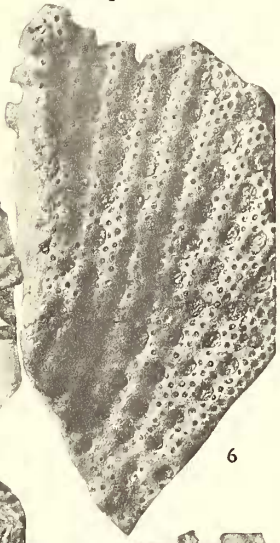

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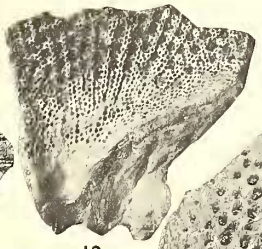

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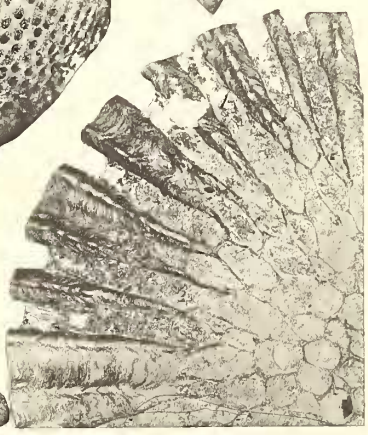

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PHILLIPS ROSS, Lower Permian Bryozoa

In transverse sections the zooecial tubes are polygonal in the axial region. The zooecial walls are greatly thickened in the wide peripheral region but are only slightly moniliform. The zooecia and shallow mesopores have laminate walls in which steeply inclined laminae line the inner parts of zooecial walls and pass into the outer parts of the zooecial walls as broad, distally convex laminae. Laminae of adjacent walls merge inconspicuously or are penetrated by the steeply inclined laminae of the acanthopore walls (Pl. 11, figs. 2, 10).

TABLE 4

Measurements of *Stenopora lyndoni* sp. nov. (in mm.)

CPC numbers	*ML 90–1*	*ML 90–3*
Diameter of zoarial stem	5	4–5
No. of zooecia per 2 mm. longitudinally	6	4–5
Diameter of zooecial opening max.	0·26×0·19	0·23×0·13
min.	0·19×0·13	0·09×0·07
Diameter of mesopore	(0·05–0·06)×0·02	(0·04 to 0·06)×(0·04 to 0·05)
Diameter of acanthopore	0·02–0·09	0·02–0·07
Zooecial wall thickness	0·08–0·21	0·13–0·26
Width of peripheral region	1·8	not det.
Ratio: width of peripheral part of zooecium/total width of zooecium	0·68	not det.
No. of large acanthopores per zooecial opening	3–4	3–6
No. of small acanthopores per zooecial opening	1	1–3
No. of mesopores per zooecial opening	0–3	0–3

Remarks. Stenopora lyndoni is characterized by slender zoarial stems and small zooecial openings enclosed by wide zooecial walls that are penetrated by prominent acanthopores and small mesopores. It differs from *S. dickinsi* in its smaller zooecial openings and in having small mesopores, 0–3 per zooecial opening.

Order CRYPTOSTOMATA
Family FENESTELLIDAE
Genus POLYPORA M'Coy

1844 *Polypora* M'Coy, p. 206.

Type species. Polypora dendroides M'Coy, 1844, p. 206, pl. 29, fig. 9.

Diagnosis. Infundibuliform or flabellate Fenestellidae having zooecia arranged in three or more rows on the branches, except just after bifurcation, where only two rows may be present.

Polypora lyndoni sp. nov.

Plate 9, figs. 6, 10–12; Plate 11, figs. 4, 5

Type material. Holotype CPC ML 107–20, paratypes CPC ML 107–21 to –28, uppermost part of the Lyons Group, locality ML 107, Lyndon River area. Paratypes CPC ML 109–10 to –16; upper part of the Lyons Group, locality ML 109, Lyndon River area. Paratypes CPC ML 6–5 to –10, locality ML 6 (3½ miles west of north of 'Moogooree' Homestead), considered to be located in the lower part of the Lyons Group and in its lowest known marine beds. Paratypes CPC ML 90–10 to –15, 45 feet below the top of the Lyons Group; locality ML 90, Lyndon River area.

Description. Colonies are funnel-shaped and grow from circular or oval bases 3 to 15 mm. or more in diameter (Pl. 9, figs. 10, 11). The zoarial fragments examined are up to 40 mm. high and above the first 20 mm. the tall, narrow funnels display pronounced flanging of the fenestrate branches. The zoarial bases of solid calcareous material rise 3 to 8 mm. or more in height, lack zooecia, and may have flanges and rootlets.

The zooecial openings lie on the inner surfaces of the fenestrate funnels and the delicate meshwork is poorly defined in the first 2 to 5 mm. (Pl. 9, figs. 11, 12). Above this the slender, smooth, and flat zoarial branches each have three rows of zooecia which extend continuously along the branches (Pl. 9, fig. 6). Four zooecia are generally present just before bifurcation. The obverse surfaces of the branches display fine striae that form irregular polygons and circles around the zooecial openings. The reverse surfaces of the colonies display longitudinally striate branches. The meshwork formula is $8\frac{1}{2}$–13 | $7\frac{1}{2}$–10 || 15–17 | 2–3. The branches are very straight and the meshwork remains regularly developed. The zooecial openings, which are without peristomal rims, do not project into the fenestrules. The lateral rows of zooecia commonly encroach onto the narrow dissepiments. The fenestrules are oval or circular on the obverse surface but commonly appear square, polygonal, or circular on the reverse surface. On the obverse surface the short, narrow dissepiments are commonly depressed below the level of the branches.

In shallow tangential sections the zooecial walls have an amalgamate, laminate microstructure, and the round zooecial openings do not show hemisepta. In very shallow tangential section bands of small capillaries, 0·01 mm. in diameter, fill the zooecial walls, weave around the zooecial openings, and extend across the dissepiments (Pl. 11, fig. 5). Tubules, 0·05 to 0·08 mm. in diameter, occur at the junctions of zooecial walls (Pl. 11, fig. 5). Deep tangential sections show hexagonal, basal zooecial sections (Pl. 11, fig. 4).

Remarks. Polypora lyndoni sp. nov. is characterized by a delicate, fenestrate meshwork of slender branches, three rows of zooecia across a branch, small fenestrules, fine capillaries of 0·01 mm. diameter, and occasional tubules at the junctions of zooecial walls. It closely resembles *P. pertinax* Laseron (Crockford 1941, pp. 412–13) from the *Eurydesma cordatum* horizon, Allandale, N.S.W. The two species are similar in the number of branches and fenestrules per 10 mm., in having about the same number of zooecia per 2 mm., and the occasional small tubules at the junctions of zooecial walls. *P. lyndoni* has

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EXPLANATION OF PLATE 10

Figs. 1–9. *Stenopora fisheri* sp. nov. 1, Tangential section showing arrangement of zooecial openings, slender zooecial walls, mesopores, and acanthopores, locality ML 109, CPC ML 109–4, ×20. 2, 3, External aspect of branching zoarial fragments, locality ML 107, CPC ML 107–7, ML 107–8, respectively, ×5. 4, Part of tangential section showing zooecial opening with slender zooecial walls that are penetrated by larger acanthopores and mesopores, locality ML 109, CPC ML 109–4, ×100. 5, Part of longitudinal section in peripheral region showing moniliform walls, locality ML 107, CPC ML 107–4, ×50. 6, Tangential section showing numerous mesopores and acanthopores around zooecial openings, locality ML 107, CPC ML 107–4, ×20. 7, Tangential section showing large acanthopores and mesopores between large zooecial openings, locality ML 107, CPC ML 107–4, ×50. 8, Tangential section showing zooecial openings, prominent acanthopores, and mesopores, locality ML 109, CPC ML 109–4, ×50. 9, Part of longitudinal section in peripheral region showing laminate, moniliform zooecial walls, locality ML 107, CPC ML 107–4, ×50.